mentioned, the motor drive circuit 18 activates the motor in response to the motor drive signal so that the motor periodically and cyclically rotates the mirror 16A along clockwise and counterclockwise directions in the predetermined limited angular range. The periodical and cyclical rotation of the mirror 16A causes the detection area to be periodically scanned by the forward pulse laser beam. Preferably, the period of the scanning is fixed to a prescribed value.

The microcomputer 90 is connected with the signal generation circuit 40. The microcomputer 90 generates a light-emission start requirement signal and a pulse-width control signal. The microcomputer 90 outputs the light-emission start requirement signal and the pulse-width control signal to the signal generation circuit 40 in synchronism with outputting the motor drive signal. Specifically, the microcomputer 90 repetitively executes outputting the light-emission start requirement signal and the pulse-width control signal plural times per period of the scanning of the detection area. The signal generation circuit 40 produces the transmission signal in response to the light-emission start requirement signal and the pulse-width control signal. The transmission signal has a train of pulses. The time point of the leading edge of every pulse in the transmission signal is determined by the light-emission start requirement signal. The width of every pulse in the transmission signal is determined by the pulse-width control signal. As previously mentioned, the laser-diode drive circuit 12 activates and deactivates the laser diode 11 in response

to the transmission signal so that the laser diode 11 emits the pulse laser light. Every pulse of the laser light corresponds to a pulse in the transmission signal. Therefore, the time point of the leading edge of every pulse in the laser light is determined by the light-emission start requirement signal. The width of every pulse in the laser light is determined by the pulse-width control signal.

The microcomputer 90 generates the power control signal. The microcomputer 90 outputs the power control signal to the laser-diode drive circuit 12. As previously mentioned, the laser-diode drive circuit 12 adjusts the power of the pulse laser light in response to the power control signal.

During every scanning period, a plurality of pulses of the forward laser beam are sequentially transmitted from the light emitting portion 10 in different directions (different angular directions) D1, D2, D3, ···, and DN which form the detection area as shown in Fig. 2. Here, "N" denotes a predetermined natural number. Specifically, during every scanning period, a train of pulses of the forward laser beam is transmitted from the light emitting portion 10 in a direction which is sequentially changed among the directions D1-DN. In the case where an object exists at a position in the detection area which corresponds to one of the directions (the angular directions) D1-DN, a pulse of the forward laser beam encounters the object before being at least partially reflected thereby. A portion of the reflected laser beam pulse returns to the apparatus of Fig. 1 as an echo laser beam pulse. Specifically, the echo laser beam pulse is incident to the light receiving element 21,

being converted into a corresponding electric signal (an echo signal). The echo signal travels from the light receiving element 21 to the comparator 35 via the amplifier 31. In response to the echo signal, the comparator 35 outputs a high-level decision signal representing the reception of the echo laser beam pulse by the light receiving element 21. In the absence of an echo laser beam pulse received by the light receiving element 21, the comparator 35 outputs a low-level decision signal. Every pulse in the decision signal outputted from the comparator 35 corresponds to one of pulses in the transmission signal produced by the signal generation circuit 40.

The time measurement circuit 50 receives the binary decision signal from the comparator 35. The time measurement circuit 50 receives the transmission signal from the signal generation circuit 40. The time measurement circuit 50 measures the time interval between a pulse in the binary decision signal and a corresponding pulse in the transmission signal. The time measurement circuit 50 generates a signal representing the measured time interval. The time measurement circuit 50 outputs the time-interval-representing signal to the microcomputer 90.

The microcomputer 90 calculates the distance to an object from the subject vehicle on the basis of the velocity of light and the measured time interval represented by the output signal of the time measurement circuit 50. In the case where the calculated distance to an object is shorter than a reference value, the microcomputer 90 outputs a signal of warning an occupant of the subject vehicle